

Appln No. 09/654,376

Amdt date January 5, 2005

Reply to Office action of October 5, 2004

REMARKS/ARGUMENTS

Claims 1, 2, 4-44, and 46-88 are pending. Claims 1, 4, 5, 7-9, 11, 12, 14, 15, 17, 19, 20, 22, 23, 32, 33, 40, 41, 43, 46-51, 53, 54, 56, 57, 59, 61, 62, 64, 65, 74, 75, 78, 82, and 83 are amended, and claims 3 and 45 are canceled.

Applicant has amended FIG. 14A to update the reference number to packetization engine to conform with the specification as well as FIG. 6. Specific support for the amendment can be found on page 16, line 27. Therefore, no new matter has been added.

Claim 78 is rejected under 35 U.S.C. § 112, second paragraph because of informalities. In view of the amendment to claim 78, it is respectfully requested that the above-mentioned rejection be withdrawn.

Claims 1-3, 5, 9-12, 17-20, 43-45, 47, 51-54, and 59-62 are rejected under 35 U.S.C. 102(b) as being anticipated by Hardwick et al. (US 5,216,747). Claims 6-8, 14-16, 22-24, 48-50, 56-58, and 64-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hardwick in view of Yato et al. (US 4,282,406). Claims 25-30, 35-37, 39, 67-72, 77-79, 81, and 85-88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hardwick in view of Barghouti et al. (US 6,535,521 B1). Claims 32-34, 40-42, and 82-84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hardwick in view of Yato and Barghouti. Claims 4, 13, 21, 55, and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hardwick in view of Soumagne (US 4,331,837). Claims 38, 46, 73, and 80 are rejected under 35 U.S.C. 103(a) as being unpatenable over Hardwick in

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view of Barghouti and Soumagne. Claims 31 and 74-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hardwick in view of Yato and Bargouti and Soumagne.

Applicants submit that all of the claims currently pending in this application are patentably distinguishable over the cited references, and reconsideration and allowance of this application are respectfully requested.

Amended independent claims 1 and 43 include, among other limitations, "estimating a power of the signal," "autocorrelating the signal," "estimating a period of the autocorrelated signal," "comparing the estimated power to a power threshold and estimated period to a period threshold," and "detecting voice in the signal as a function of the comparing." Amended independent claims 9, 17, 51, and 59 include, among other limitations, "autocorrelate a signal," "estimate power of the signal," "detect pitch of the autocorrelated signal," and detect "voice in the signal as a function of the autocorrelated signal, the estimated power and the estimated pitch." Hardwick does not teach, nor does it suggest the above limitations.

Rather, Hardwick describes a pitch estimation method of an acoustic signal. "The pitch P is estimated using a two-step procedure. We first obtain an initial pitch estimate denoted by P_1 . The initial estimate is restricted to integer values. The initial estimate is then refined to obtain the final estimate P, which can be a non-integer value." (Col. 2, lines 57-62, underlining added.). "Pitch tracking is used to improve the pitch estimate by attempting to limit the amount the pitch changes between consecutive frames." (Col. 3, lines 29-31,

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underlining added.)). "Look-back tracking is used to attempt to preserve some continuity of P from the past frames." (Col. 3, lines 39-40, underlining added.)).

Hardwick further describes an improved method of pitch estimation in which "the non-integer values of an intermediate autocorrelation function used for sub-integer resolution pitch values are estimated by interpolating between integer values of the autocorrelation function." (Col. 7, lines 34-38, underlining added.)). Therefore, the method of Hardwick estimates the pitch of the signal and as a direct result of the pitch estimation, it determines whether the signal is a voice signal.

In contrast, the present invention estimates a power of the signal, autocorrelates the signal, estimates a period of the autocorrelated signal, compares the estimated power to a power threshold and estimated period to a period threshold, and finally detects voice in the signal as a function of the comparison. Accordingly, amended independent claims 1, 9, 17, 43, 51, and 59 are not anticipated by Hardwick.

Additionally, dependent claims 2, 10, 18, 28, 36, 44, 52, 60, 70, and 78 include the limitation of "wherein the signal comprises first, second and third frames, the first frame preceding the second frame in time and the second frame preceding the third frame in time, the method further comprising vacating the voice detection for the second frame if voice is not detected in both the first and third frames." Hardwick does not teach, nor does it suggest the above limitation.

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Rather, Hardwick describes "tracking the signal energy [to] estimate the signal energy in the current frame relative to the recent past history. If the relative energy is low, then the signal is more likely to be unvoiced, and therefore the threshold is adjusted to give a biased decision favoring unvoicing. (Col. 10, lines 36-41, underlining added.). Therefore, the method of Hardwick only "looks back" to previous frames, and not "adjacent" frames which include the "next" frame. Consequently dependent claims 2, 10, 18, 28, 36, 44, 52, 60, 70, and 78 are also not anticipated by Hardwick.

Dependent claims 2, 4-8, 11-16, 19-26, 44, 46-50, 53-58, and 61-68 are dependent from allowable independent claims 1, 9, 17, 43, 51, and 59, respectively and therefore include all the limitations of their respective independent claims and additional limitations therein. Accordingly, these claims are also allowable over the cited references, as being dependent from allowable independent claims and for the additional limitations they include therein.

Claims 25-30, 35-37, 39, 67-72, 77-70, 81, and 85-88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hardwick in view of Barghouti et al. (US 6,535,521 B1). Applicants submit that the above claims are patentably distinguishable over the cited references.

The Office action states that Barghouti's disclosure of not using a back end module when processing non-speech frames teaches terminating the voiceband data exchange and invoking the voice exchange when the voice detector detects voice in the signal, as recited by independent claims 27, 35, 69, and 77.

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Applicants respectfully disagree. Barghouti's front end module and back end module are not the same as the claimed voiceband data exchange and voice exchange. The front end module of Barghouti "analyzes the incoming speech PCM data sample stream and then sends them over link 144 to the assigned back-end module 140 (step 230). The back-end module 140, in turn, formats and converts the digital samples into intelligible encoded speech frames packets and simultaneously also generates SID frames based on noise level patterns identified from the digital samples (step 240)." (Col. 8, lines 24-31).

In contrast, the voice exchange of the claimed invention is "capable of exchanging voice in the signal between a telephony device and a network" and the voiceband data exchange is "capable of exchanging data in the signal between a data device and the network." Therefore, Barghouti does not teach terminating the voiceband data exchange and invoking the voice exchange when the voice detector detects voice in the signal," and thus independent claims 27, 35, 69, and 77 are patentable in view of Hardwick and Barghouti.

The remaining dependent claims 28-34, 36-42, 70-76, and 78-88 are dependent from allowable independent claims 27, 35, 69, and 77 and therefore include all the limitations of their respective independent claims and additional limitations therein. Accordingly, these claims are also allowable over the cited references, as being dependent from allowable independent claims and for the additional limitations they include therein.

In view of the foregoing amendments and remarks, it is respectfully submitted that this application is now in condition

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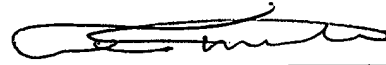
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for allowance, and accordingly, reconsideration and allowance
are respectfully requested.

Respectfully submitted,

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RRT/clv

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Amendments to the Drawings:

The attached sheet of drawings includes a replacement sheet showing changes to 14a. The attached 35 sheets of formal drawings, which includes the changes to Fig. 14a, replaces the original informal drawings as filed.

Attachment: Replacement Sheet

Annotated Sheet Showing Changes

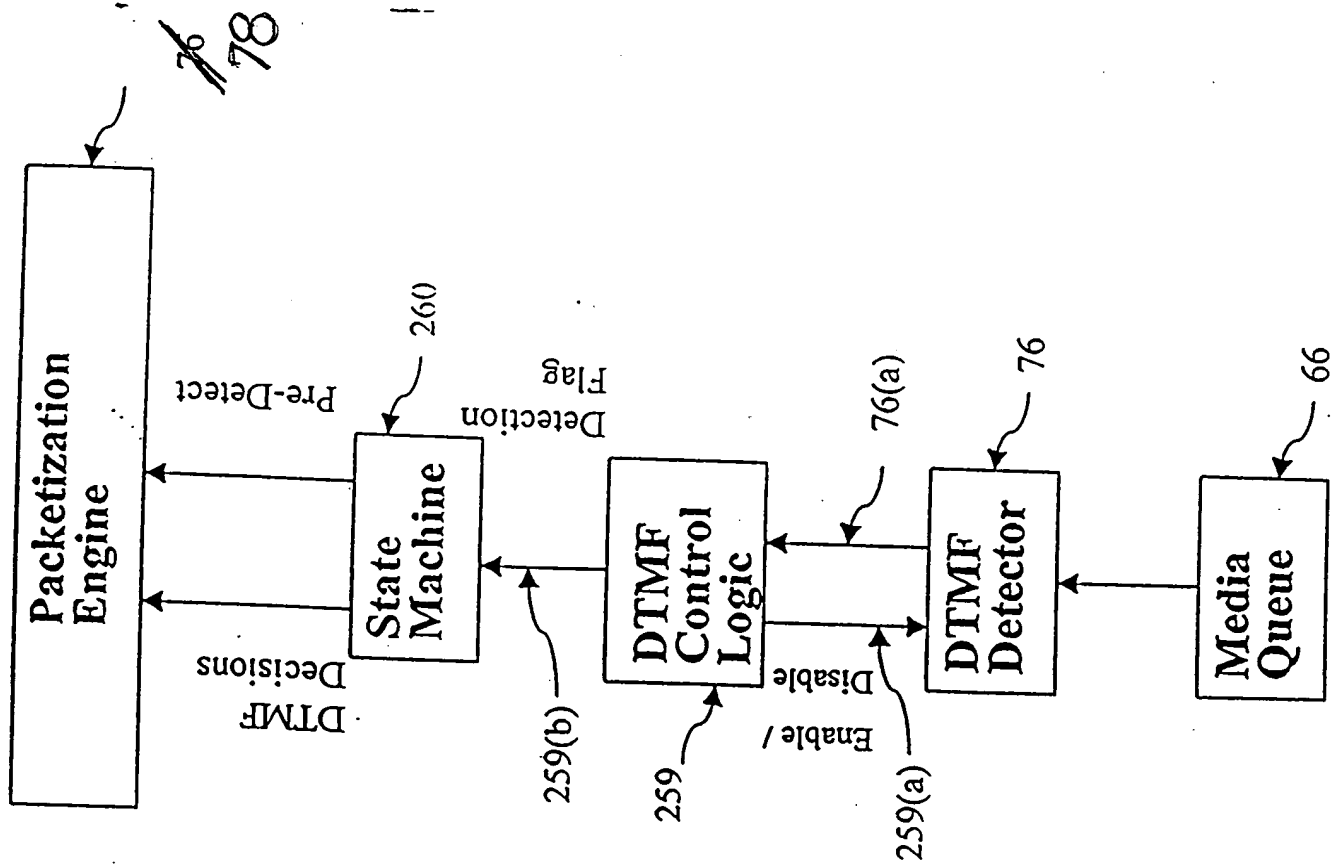


FIG. 14A